

MEMORANDUM

RM-4700-TAB

FEBRUARY 1966

DISASTER AND RECOVERY:
THE BLACK DEATH IN WESTERN EUROPE

Jack Hirshleifer

PREPARED FOR:

TECHNICAL ANALYSIS BRANCH

UNITED STATES ATOMIC ENERGY COMMISSION

The **RAND** *Corporation*

SANTA MONICA • CALIFORNIA

LEGAL NOTICE

This report was prepared as an account of Government sponsored work. Neither the United States, nor the Commission, nor any person acting on behalf of the Commission:

- A. Makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or
- B. Assumes any liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

As used in the above, "person acting on behalf of the Commission" includes any employee or contractor of the Commission, or employee of such contractor, to the extent that such employee or contractor of the Commission, or employee of such contractor prepares, disseminates, or provides access to, any information pursuant to his employment or contract with the Commission, or his employment with such contractor.

MEMORANDUM
RM-4700-TAB
FEBRUARY 1966

DISASTER AND RECOVERY:
THE BLACK DEATH IN WESTERN EUROPE

Jack Hirshleifer

This research is sponsored by the San Francisco Operations Office of the U. S. Atomic Energy Commission under Contract AT(04-3)-414, Project Agreement No. 3. Views or conclusions contained in this Memorandum should not be interpreted as representing the official opinion or policy of the Atomic Energy Commission.

The **RAND** *Corporation*

1700 MAIN ST. • SANTA MONICA • CALIFORNIA • 90406

PREFACE

No recorded historical disaster is fully comparable to the potential catastrophe of a large-scale nuclear war. The Black Death of 1348-50, however, perhaps approaches a hypothetical nuclear war in geographical extent, abruptness of onset, and scale of casualties. In other important respects its impact was unlike that of war; in particular, there was no direct destruction of material property. And, in addition, the 14th century is so distant in time from the current period as to preclude the drawing of easy parallels. Nevertheless, the analysis of even such a remote historical experience may help illuminate some of the sources of, and limitations upon, the human potentialities for recovery from any great catastrophe.

This Memorandum represents one part of a study of the biological and environmental consequences of nuclear war which The RAND Corporation is conducting for the U.S. Atomic Energy Commission, Division of Biology and Medicine, Technical Analysis Branch (TAB).

Helpful comments and suggestions have been provided the author by a number of his colleagues at RAND, and particularly by Michael Arnsten, Edmund Dews, William A. Johnson, Russell T. Nichols, Sidney G. Winter, Jr., and Charles Wolf, Jr.

SUMMARY

The Black Death -- the great plague of 1348-50 -- and its aftermath constitute one of the very greatest disaster-recovery experiences ever recorded. The short-term consequences of the disaster include a degree of socio-political disorganization (for example, flight from cities), and changed income and status relationships due to the enhanced economic position of newly scarce labor. A rapid recovery took place in the next decade, without fundamental disruption of economic or political systems. The century following, however, saw a slow-down or reversal in the rate of economic advance of Western Europe. The extent to which this setback may have been due specifically to the 1348-50 plague is subjected to examination, in the light of other pressures and burdens upon economic performance in this era; these include disruptive wars, possible climatic changes, and the continuing drain of the plague as a result of the establishment of sources of infection in Western Europe. Although direct inferences as to possible consequences of nuclear wars can hardly be drawn from this 14th century catastrophe, the historical record does not support contentions that either social collapse or an economic downward spiral is a necessary consequence of massive disaster.

CONTENTS

PREFACE	iii
SUMMARY	v
LISTS OF FIGURES AND TABLES	ix

Section

I. INTRODUCTION	1
II. THE BLACK DEATH	4
III. AFTERMATH -- THE EARLY PERIOD	10
IV. AFTERMATH -- LONG-TERM	14
V. CONCLUSIONS	27
BIBLIOGRAPHY	29

LIST OF FIGURES

Figure

1. Trends of Gross Population in England 8

LIST OF TABLES

Tables

1. Chronology 3
2. Mortality and Population in England 7
3. Daily Wages of Agricultural Labor on the Estates of
Bishops of Winchester 16
4. Wheat Prices and Real Wages 17

I. INTRODUCTION

A previous RAND study examined a number of great disasters of modern times^{*1} in order to explore such questions as: (1) How rapid and successful were the recoveries from disaster? (2) Which government policies promoted, and which hindered, recovery? (3) To what extent was the loss due to disaster (or the failure to recover from disaster) an unavoidable consequence of the narrowed technological possibilities and resources of the post-disaster society, and to what extent was it the consequence of organizational failures and mistakes in the utilization of surviving resources? The major conclusion arrived at was that, in the instances examined, rather prompt recovery (say, within four or five years) to pre-disaster levels of well-being was technologically possible and did, in fact, take place -- with some "slippage" due mostly to avoidable mistakes in monetary policies.

This, like other related RAND studies,² was intended to cast some light on the aftermath of the great potential disaster of our age -- thermonuclear war. No disaster of modern times, however, really compares to a large-scale nuclear war, in geographic scope, suddenness of impact, and intensity of effect. There are, of course, a number of historical instances of violent destruction of particular cities (for example, Hiroshima in World War II). There are also some examples of substantial population declines over wider areas (for example, Ireland after the potato famine), but these latter instances have been more in the nature of slow decay than sudden destruction. The Black Death of 1348-50 was much closer to a hypothetical nuclear

*In the body and footnotes to this Memorandum, citations will be given in abbreviated form. Full descriptions of sources may be found in the Bibliography attached.

¹Hirshleifer, RM-3079-PR. Among the large-scale disaster-recovery experiences investigated were the Southern Confederacy during and after the American Civil War, Russia under war communism (1918-21), and Germany and Japan during and after World War II.

²Winter, RM-3436-PR; Clark and Bear, P-2093; Clark, RM-1809; Hirshleifer, P-674.

war in its geographical extent, abruptness of onset, and scale of casualties. Of course, in other important respects its impact was unlike that of nuclear war; in particular, there was no physical destruction of material property. (Thus, the Black Death is a closer analog to bacteriological than to nuclear war.) And, in addition, the 14th century is so distant in time from the current period as to preclude the drawing of easy parallels. Nevertheless, we may hope that the study of even such a remote historical experience will help provide some depth of understanding as to the human potentialities for recovery from great catastrophes. A point heightening interest in this historical episode is that it has been cited, by at least one author, in the course of a pessimistic evaluation of the prospect for recovery from the potential disaster of atomic war.¹

Another difficulty in the evaluation of social consequences specific to the Black Death is the fact that the period in which it fell was one of great turbulence in Western Europe. The effects of the pestilence are not easily separable from those of the destructive Hundred Years' War; in addition, the Western European nations and especially England and France suffered also from internal dynastic conflicts, class warfare, and regional separatism. Table 1 provides a chronology of the major events of the period surrounding the Black Death.

Finally, the reader must be warned that any attempt to evaluate the overall lessons to be drawn from complex phenomena such as disaster-recovery experiences must, necessarily, be in large part subjective and impressionistic. In the case at hand the force of this caveat is strengthened by the paucity and defects of the data available, together with all the other problems of comprehending individual and social behavior in a social and historical context very different from our own.

¹Stonier, Nuclear Disaster, Ch. 13 (especially pp. 159-61, 166-67).

Table 1
CHRONOLOGY^a

1310-22	Wars of Edward II, King of England, with barons, Scots, Irish.
1324	Fighting with French in Aquitaine.
1327	Revolt in England. Abdication and murder of Edward II, King of England; accession of Edward III.
1328-36	English intervene in Scottish dynastic conflict.
1328	Accession of Philip VI, King of France.
1328	French suppress lower-class insurrection in Flanders.
<u>1336</u>	<u>Beginning of Hundred Years' War.</u>
1337	English support revolt in Flanders.
1341	Fighting in Brittany begins between English and French candidates for dukedom.
1346	English victory over Scots at Neville's Cross, over French at Crecy.
<u>1348-50</u>	<u>Black Death.</u>
1350	Death of Philip VI, King of France; accession of John II.
1356	English victory at Poitiers; John II captured.
1357-59	Near-anarchy in France. Jacquerie suppressed. Dynastic intrigues of Charles the Bad, King of Navarre. Du Guesclin's tactics exhaust English.
1360	Truce of Bretigny.
<u>1360-61</u>	<u>Recurrence of plague.</u>
1364	Death of John II, King of France; accession of Charles V.
1367-69	Fighting in Spain ends in victory of French-backed contender, Don Henry.
1369	<u>Recurrence of plague.</u>
1369-75	Resumption of Hundred Years' War; French successes.
1374	<u>Recurrence of plague.</u>
1375	Truce of Bruges; English retain only Calais and small portion of Gascony.
1376	"Good Parliament" in England; independence of Commons.
1377	Death of Edward III, King of England; accession of Richard II.
1380	Death of Charles V, King of France; accession of Charles VI.
1381	Peasants' Revolt in England.
1382	French crush English-supported insurrection in Flanders.
1399	Revolt in England. Deposition of Richard II, accession of Henry IV.
1402-06	English defeat Scots.
1400-16	Revolt of Welsh suppressed.
1413	Cabochian riots in Paris.
1413	Death of Henry IV, King of England; accession of Henry V. Resumption of war with France.
1415	English victory at Agincourt.
1418	English occupy Paris.
1420	Burgundians ally themselves with English.
1422	Death of Henry V, King of England; accession of Henry VI. Death of Charles VI, King of France; accession of Charles VII.
1429	French victory at Orleans; Joan of Arc.
1429-53	French gradually reconquer national territory.
1450	Jack Cade's Rebellion.
<u>1453</u>	<u>End of Hundred Years' War; English retain only Calais.</u>

Note:

^aBased mainly on Previte-Orton, Cambridge History, Ch. 29, 33.

II. THE BLACK DEATH

Throughout the historic period, plague has been endemic in certain permanent centers of infection. Three great outbreaks of the disease are recorded.¹ The first is the so-called plague of Justinian, which raged over the known world in the latter half of the 6th century. After this waned, human plague was for centuries almost unknown to Western Europe until the great pandemic of 1348-50. (Some maintain that there was a precursor plague around 1316.)² Thereafter, repeated onslaughts recurred on a gradually diminishing scale; the last London plague was in 1665, and in Western Europe the last great outburst was at Marseilles in 1720. The third outbreak began around 1890 in China; in the West its effects have been held in check by modern sanitary knowledge.

Plague is primarily a disease of rodents, carried to man by the flea. Some historians have blamed the plague of 1348-50 upon the arrival of the rat in Europe, but others disagree.³ The gradual decline of the disease over the following centuries has been attributed to the replacement of the black rat (*Rattus rattus*) by the brown rat (*Rattus norvegicus*). The latter, a better fighter, has driven out the former except on shipboard and in the vicinity of ports. From the human point of view the brown rat is a less unpleasant neighbor, as he prefers to live out-of-doors -- and even more important, his fleas have more aversion to biting human beings than do those of the black rat.⁴

Plague in human beings takes two main forms: bubonic and pneumonic (a third form, the septicemic, is sometimes reported). Bubonic plague is characterized by swellings (buboes), especially in the

¹ Saltmarsh, pp. 30-32.

² Slicher van Bath, p. 88.

³ Langer, "The Black Death," p. 114.

⁴ Saltmarsh, pp. 32-34.

groin and armpits. This is the less fatal form, with a typical mortality rate of perhaps 50 per cent. It is not infectious from man to man but requires the intervention of the flea. The pneumonic form is seated in the lungs; it is extremely infectious and nearly always fatal. In the bubonic form an outbreak of the disease dies down in the winter, but in the pneumonic form it will rage more violently than ever in the cold season. Pneumonic plague is less common, but when it occurs the mortalities may be enormous; the Black Death itself was a combined attack of both forms of plague.

There have been some fluctuations of opinion over the years about the scale of mortality attendant upon the original plague of 1348-50, and the later visitations during the next quarter-century. The reports of contemporary chroniclers abound with tales of total or near-total depopulation, often still repeated in non-technical writings. Generally speaking, however, historians today place a more moderate estimate on the scale of casualties. Without necessarily dismissing all the early reports as fabulous, it is evident that there is a tendency for occasional chronicles to record, even if they do not exaggerate, the extreme and unusual as opposed to the typical. Modern historians, in contrast, are in a position to base opinions on spotty but nevertheless rather extensive surviving manorial, legal, and church documents.¹ The impression one gains from such records is that the Black Death proper carried off between a quarter and a third of the population of Western Europe, while the later attacks -- the Pestis Secunda of 1360-61 and the plagues of

¹The reference here is to mortalities in England and France. It cannot be definitely determined whether the plague produced relatively greater casualties in other European countries. As an example of the sort of disagreement that may arise, a modern art historian concludes (on the basis of chroniclers' reports) that "during the summer months of 1348 more than half the inhabitants of Florence and Siena died of the bubonic plague" (Meiss, p. 65). Such a conclusion about a particular city or cities is not beyond the bounds of credibility, but is more likely exaggerated.

1369 and 1374¹ -- may each have swept away around 5 per cent of the populations remaining.²

Russell's detailed study for England,³ seemingly the only attempt to weigh the demographic evidence scientifically, comes to a somewhat different conclusion (see Table 2). Russell's data tend to discount the scale of the original Black Death somewhat (in comparison with the general opinion of scholars), and to magnify the later blows. The demographic factors, not previously appreciated, explaining the differences are: (1) making a proper allowance for age-distribution of the initial populations and of the survivors, rather than simply averaging the documented mortality rates; and (2) deducting normal mortality. This latter is especially significant, since the Black Death extended over a period of about 2-1/3 years. As Russell estimates the normal annual mortality at 3 per cent, this factor reduces the observed mortality rate of 23.6 per cent over the Black Death period to around 16.6 per cent, which may be interpreted as the proportionate "excess mortality" associated with the disaster. Table 2 indicates that the 1369 visitation produced an excess mortality of 10.0 per cent in one year, a per annum rate greater than that of 1348-50. Cumulatively, the later attacks outweighed the Black Death itself (see also Fig. 1, reproduced from Russell's book).

With respect to overall population trends, Postan (one of the leading students of this era) argues on the basis of price and occupancy data that population decline began some thirty years before the Black Death.⁴ (The question of whether the plague initiated the population decrease of the following century takes on considerable importance in interpreting the evidence as to the post-disaster recovery or lack of recovery.) Russell admits some

¹Some sources date this recurrence in 1375.

²Saltmarsh, pp. 34-38; Bean, p. 424; Langer, "The Black Death," p. 114.

³Russell, British Medieval Population.

⁴Postan, "Some Economic Evidence," p. 245.

Table 2

MORTALITY AND POPULATION IN ENGLAND^a

	Mortality Rate in Period (per cent)	Normal Mortality in Period (per cent)	Excess Mortality in Period (per cent)	Population Remaining	Population Index (1348 = 1)
1348				3,757,500	1.0
Plague periods					
1348-50	23.6	7	16.6	3,127,500	.836
1360-61	18.7	6	12.7	2,745,000	.730
1369	13.0	3	10.0	2,452,500	.657
1374	11.6	3	8.6	2,250,000	.600

Notes:

^aData are reproduced as shown in the cited source. There seem to be minor discrepancies in the calculations. Also, the technique of deducting the "normal" 3 per cent mortality is strictly correct only if the population would have been stationary under that mortality rate. (I am indebted to Russell T. Nichols for this point.)

Source:

Russell, British Medieval Population, p. 263.

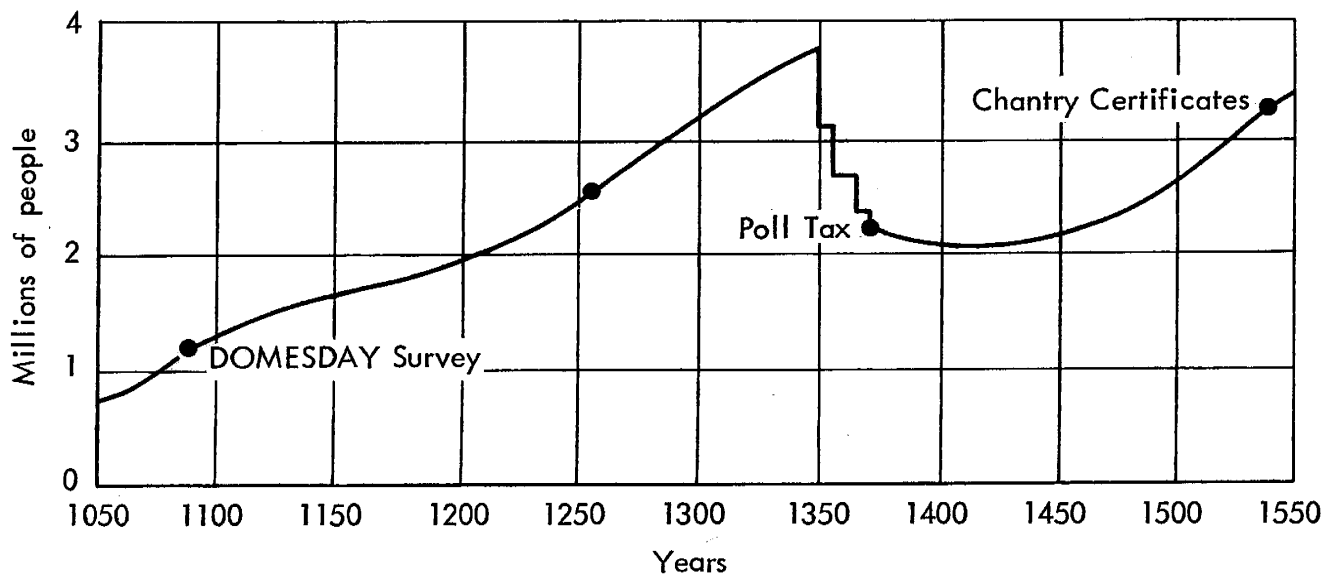


Fig.1 —Trends of gross population in England

Source:

Russell, British Medieval Population, p. 280.

retardation in the rate of growth before 1348, but nevertheless his chart (Fig. 1) shows a rising population curve to that date.¹

The discussion of the Black Death and its aftermath as a disaster-recovery experience will be divided into two main headings. The first will take up the real or alleged immediate and relatively early consequences, distinguishing between social and political effects on the one hand and economic on the other. The time-span considered is up to perhaps a decade in length; during this period the line of causation, as to what are properly effects of the plague as such and what are coincidental consequences of other acting forces, is fairly clear. The next section will take up a much longer period, up to perhaps a century, in which long-term effects of the Black Death have been asserted to play a significant role. In dealing with this latter topic, the key problem will be to isolate the effects of the initial plague disaster from those of other events leaving their mark upon the same period.

¹Russell, pp. 259-60, 280.

III. AFTERMATH -- THE EARLY PERIOD

There are curious divergences in the contemporary reporting of social and political events during and immediately after the Black Death. Some writers describe extremes of socially disruptive behavior (flagellant cults, massacres of Jews,¹ flight of upper classes), whereas the reports of other chroniclers emphasize the continuity of established forms and institutions.² That there was some flight from the cities seems certain, and yet it is clear that government did not collapse. (One reason, perhaps, is that the disease did not strike a whole nation at once; in Britain it began in the southeast in the fall of 1348, waxed greatly while spreading north and west during 1349, and by 1350 was mostly limited to Scotland.) The following remarks on the enrollment of wills in London's Husting Court are suggestive of the course of the disease. They also signify the continuation of this bureaucratic function through all but a few months:

Those who died of the plague leaving wills were, of course, but a small fraction of the whole mortality; but the wills during some eight months of 1349 are ten or fifteen times more numerous than in any other year before or after, excepting perhaps the year of pestis secunda, 1361. Starting from 3 in November, 1348 (none in December), the probates rise to 18 in January, 1349, 42 in February, 41 in March, none in April (owing to paralysis of business, doubtless), but 121 in May, 31 in June, 51 in July, none in August and September, 18 in October, 27 in November, and then an ordinary average.³

¹Massacres took place primarily in Germany. The Jews had previously been expelled from England and, for the most part, from France.

²Boccaccio's Decameron opens with a famous description suggesting a breakdown of organized society in Florence. Froissart, in his Chronicles, also comments on the flagellants and the persecution of the Jews -- but his reports on government and church activities suggest that established institutions continued to function. Froissart indicates that the Jews were despoiled at the instance of the lords, and were protected in papal territories. As indicated in a footnote earlier, it is possible that Florence suffered unusually high mortality. On the other hand, mortality was certainly high in London (Creighton, p. 128) where no breakdown occurred.

³Creighton, pp. 117-8.

A similar continuity of agricultural records is shown by Miss Levett, who accordingly denies the earlier view that anarchy reigned in the countryside.¹

The English Parliament was prorogued on account of the plague several times during 1349; it did not meet again until 1351. However, a considerable number of ordinances and decrees on economic matters were issued by the King's Council in 1349 and 1350. The Hundred Years' War was in a period of truce, but in the last days of 1349 Edward III led troops in combat before Calais. During 1350 a great feast was held at Windsor to celebrate the institution of the Order of the Garter. Also during this year, extensive military and naval preparations were organized, and a Spanish fleet was defeated in a great engagement. Froissart reports great celebrations in France upon the accession of John II (1350); the Order of the Star was instituted about this time. The French parlement, which ordinarily convened only when the King needed funds, did not meet until 1355. In that year, it issued large grants for the conduct of the war. Also in 1355 began the campaign of the Black Prince that ended in the great English victory at Poitiers (1356). It is evident from this recital that paralysis of government in England and France, if it occurred at all, was limited to the period when the plague was actually raging.

Turning to the economic impact of the disaster, traditional doctrine tells us that the equilibrium rate of wages must have risen consequent upon the new scarcity of labor. And a rapid rise in wages certainly did occur. The following is illustrative (data refer to England):

Threshing will be taken as being the most significant type of labor....Up to the time of the Great Plague, threshing was paid at steady, and on the whole low, rates. But directly afterward the wages were doubled. The increase due to the plague is 32 per cent for the threshing of wheat, 38 per cent for barley, 111 per cent for oats in

¹Levett, pp. 72, 142-43.

the eastern counties. In the middle counties the percentages of rise are 40, 69, 111; in the south, 33, 38, 175; in the west, 26, 41, 44; in the north, 32, 43, and 100.¹

One of the most interesting developments was the Statute of Laborers in England (1351), a Parliamentary enactment that had been anticipated by an ordinance of the King's Council in 1349.² The Statute fixed wages at the pre-disaster level, forbade idleness, and required reasonable prices for necessities. It would appear that serious efforts were made for some years to enforce these regulations.³ The French Statute of Laborers⁴ had a similar origin, but seems to have been largely a dead letter. That per capita income of the lower classes (the vast majority, of course) tended to rise is evidenced by innumerable reports of individuals of lower status stepping up to fill vacant places, of remissions and recontracts of feudal dues, as well as by complaints against unwontedly lavish living by "wasters" and nouveaux riches.⁵ Correspondingly, however, the scarcity of labor led to falling rents.⁶ As a result, high-status individuals tended to suffer diminution of income.

In the aftermath, economic as well as political recovery from the crisis took place promptly. Agriculture was of course the overwhelmingly dominant industry; vacant manorial places were rapidly

¹Robbins, p. 463. Note the seeming inconsistency between the generalization about the "doubling" of wages and the particular percentages shown; the generalization may refer only to "panic" rates in the immediate aftermath. See also Seeborn, p. 269; Creighton, p. 185; Mullett, p. 23; Robbins, p. 470.

²Ordinances in the same year forbade migration to Scotland, and taking money out of the kingdom. See Mullett, p. 23.

³Robbins, p. 476.

⁴Ibid., pp. 474-5.

⁵Creighton, p. 187; Robbins, p. 450. In England, a Statute of Dress of 1363 forbade the lower classes to imitate upper-class attire. (But even in 1336, it is reported, a law forbade many courses at meals.)

⁶Robbins, pp. 461-2.

filled by a general up-grading of holdings, with abandonment of some marginal lands no longer worthy of cultivation by the thinned labor force. Direct evidence on trade and industry is largely lacking, but the ability of the English and French kings to call for and obtain renewed support for military campaigns (see above) seems to deny the possibility of any but short-lived paralysis in the non-agricultural sectors. It appears that competition was lively between country and town for scarce labor, newly "mobilized" by the widened opportunities everywhere.¹

¹Creighton, p. 197; Robbins, pp. 468-73.

IV. AFTERMATH -- LONG-TERM

Several authors have asserted that the short-term recovery from the Black Death, described above, was but temporary or illusory and that a long-lasting depression set in shortly thereafter.¹ Others, without necessarily tying the onset of the recession to the event of the Black Death, have maintained that the century following 1350 was generally depressed.² There are two great questions about this "economic depression of the Renaissance": First, did it really occur? And second, if so, was the Black Death its cause?

There has been a lively controversy among economic historians as to whether the century following the Black Death was in actuality a period of economic recession. In view of the reduced population, that aggregate production was on the whole lower in 1350-1450 than in 1250-1350 is obvious but hardly relevant; the question at issue is whether there was a depression in the sense of impoverishment -- whether per capita production fell. Historians writing on this topic have, regrettably often, been unable to keep these two questions apart and may thus have debated at cross-purposes.³ The following points, however, can be regarded as established in comparing the century after 1350 with the century before. (1) A great increase in real wages and the standard of life of the laboring classes, both rural and urban, took place;⁴

¹Saltmarsh, pp. 25-26; Langer, "The Black Death," p. 118.

²For example, Postan ("Some Economic Evidence," p. 245) and Slicher van Bath (pp. 89, 132) suggest that the depression was a natural reaction to excessive agricultural expansion in the previous centuries (see below).

³For example, Lopez and Miskimin, among the leading proponents of the "depression" hypothesis, show only that aggregate production fell and state their inability to draw conclusions as to per capita income (p. 410). Cipolla, an "anti-depression" scholar, does not deny the fall in aggregate production but argues that per capita income rose (pp. 523-24).

⁴Cipolla, pp. 523-24; Postan, "Some Economic Evidence," pp. 225-29; Beveridge, pp. 164-65; Slicher van Bath, pp. 137-40. War-ravaged France may have been an exception to the general European picture, however (ibid., p. 139).

(2) A very considerable decline in rents, and therefore in the incomes of the propertied classes, also occurred.¹ In short, the long-term effects paralleled the short-term ones with respect to the relative position of the two great social classes.

The first of these points and, by implication, the second are illustrated by the English data in Table 3 showing wage indexes in nominal monetary units, in grains of silver, and in wheat. Postan remarks, in a footnote, that the figures probably understate true wages in the period during which the Statute of Laborers was effective (presumably, the first decade or two after 1350) -- as the Bishop tended to make a show of conformity while actually evading the law.

The fall in the price of wheat relative to wages, that provides quantitative support for the innumerable reports of declining land rents, is also displayed by the data in Table 4. Note that the wheat price indexes also reach a peak in the 1301-50 period, falling steadily thereafter until 1500.

Among the points that may be regarded as still in doubt are the overall behavior of per capita income when rising wages and falling rents are considered together. There is another interesting question, the relative prosperity of towns versus countryside, on which the historical authorities seem hopelessly divided. Langer argues that a depression in agriculture took place first, leading to a massive movement of rural population to the towns.² Postan denies that any net movement took place; also, he indicates that urban and rural wages rose in about the same proportion.³ Creighton emphasizes disparities from one town to the next.⁴ Robbins draws a contrast between an

¹Postan, "Some Economic Evidence," p. 237, "The Fifteenth Century," pp. 161-62; Robbins, pp. 461-62.

²Langer, "The Black Death," p. 118.

³Postan, "Some Economic Evidence," pp. 231-34.

⁴Creighton, pp. 195-97.

Table 3

DAILY WAGES OF AGRICULTURAL LABOR ON THE
ESTATES OF BISHOPS OF WINCHESTER

Years	Index of Wages in Silver Pence	Index of Wages in Grains of Silver	Index of Wages in Wheat
1300-19	100	100	100
1320-39	124	125	140
1340-59	133	117	148
1360-79	169	142	154
1380-99	188	153	235
1400-19	189	143	210
1420-39	189	130	200
1440-59	189	125	236

Source:

Postan, "Some Economic Evidence," p. 226. The index in grains of silver has been calculated from other data in the source.

Table 4
WHEAT PRICES AND REAL WAGES

Years	Index of Wheat Prices, France (1721-45 = 100)	Index of Wheat Prices, England (1721-45 = 100)	Index of Real Wages, England ^a (1721-45 = 100)
1201-50	41.9	35.8	-
1251-1300	51.5	47.8	110.0
1301-50	75.9	53.1	115.7
1351-1400	65.4	43.9	145.7
1401-50	61.7	36.1	182.9
1451-1500	31.8	27.7	170.0
1501-50	57.8	30.0	182.9 ^b

Notes:

^aThreshing labor, piecework.

^bThis figure is perhaps a typographical error. Other sources agree that real wages were significantly lower for this period.

Source:

Slicher van Bath, pp. 326-27.

urbanization trend in England, and urban depopulation due to war and brigandage in France.¹ Herlihy reports a greater decline of the rural than the urban population of Pistoia in Italy.²

In the hundred years 1350-1450 on a priori grounds there would have been considerable reason to anticipate a rather definite increase in per capita income overall. First, the short-term aftermath of the disaster in all probability led to a jump in real per capita wealth -- recovery from the crisis was associated with a general upgrading of holdings. Since population did not increase rapidly thereafter (see Fig. 1), the continuing long-term trend of improvement in technology, plus the possibilities for reallocating resources in line with the changed availabilities of land and labor, could operate without encountering increased numbers of mouths to feed. Leaving aside the question of whether an overall reduction in per capita income may have taken place, it would appear that failure to achieve a marked increase in this period may have been a significant development lending some support to pessimistic views of the ability of societies to recover from massive disasters.

A number of hypotheses have been put forward to explain what seems to be a lagging pace of economic development in Western Europe during the hundred years after 1350. Hypotheses involving forces other than the Black Death will here be considered first, after which an attempt will be made to place the role of the Black Death in its proper perspective.

Apart from the plague, war is the most obvious factor damaging the Western European economies during this period. England was heavily burdened by wars with Scotland, Spain, and the Hanseatic League, and rebellions in Ireland and Wales in addition to the conflict in France; furthermore, the final outcomes were mainly adverse for her. But France was even more severely affected by the repeated ravages of the

¹Robbins, pp. 471-73.

²Herlihy, p. 231.

armies of England and her separatist allies, not to mention recurrent class conflicts and periods of near-anarchy. The evidence that most strongly suggests the impact of war is the comparative fate of urbanization in England and France during this period. For England the records of city growth in the century after 1350 are very uneven; some towns, and especially Norwich (previously the second city in the kingdom), declined sharply,¹ while others including Bristol and Coventry definitely grew. London is reported as "no less populous."² By way of contrast, the French territory involved in the Hundred Years' War was largely depopulated, and Paris itself seemed almost deserted in the 15th century.³ One author contrasts the war-caused destruction in France with an asserted rapid growth of urbanization and industrialization in England.⁴

A second economic drag upon the recovering society has been emphasized by several authors: The continuing drain represented by the onslaughts of plague following the Black Death itself.⁵ The

¹Creighton, pp. 193-4. But on Norwich compare Mullett, p. 26.

²Creighton, p. 195.

³Robbins, p. 454 n.

⁴Ibid., pp. 478-9. The plague in France is described as "almost incidental," "an aggravation of an already desperate situation," whereas in England the disorder attendant upon the pandemic provided an opportunity for the villein to desert the manor for the growing towns.

⁵Saltmarsh, passim. In a critique of Saltmarsh's thesis, Bean has argued that the fall in England's population probably terminated by about 1400, around which date the rise in agricultural wages stopped (see Table 3 above) and in urban wages slowed down (Bean, pp. 435-36). This is an assertion about the date at which the Malthusian forces -- tending to bring about an increase in births in response to the high level of wages -- began to overcome the direct and indirect effects of the plague.

great pandemics of 1361, 1369, and 1374 have already been mentioned; and recurrences of considerable magnitude continued, on a gradually declining scale, for centuries. The impact of this upon levels of per capita well-being (limiting the discussion to the purely material elements of loss) would be due primarily to the wholly or partially wasted investments in child-rearing, and in education and training.¹ It is true that the impact of early mortalities is less in an agricultural society than it would be in an industrial community, because of the lesser degree of training involved as well as the earlier start of productive contributions on the part of the child. Even so, the loss must have been very considerable. A further point worth noting is that recurrences of plague disproportionately attacked the young, presumably because older individuals tended to possess some degree of natural or acquired immunity.

A third independent cause of decline has been suggested: that there may have been an adverse climatic change in Western Europe beginning in the 14th century.² There is indeed some evidence that a cooler, wetter phase set in about this time in the North Atlantic area. The climate of Greenland and Iceland definitely deteriorated. As for England, cultivation of vineyards for wine was still at its height in the 13th century, but had disappeared by 1400.³ (As an incidental point of interest, it is possible that the onset of plague in the 14th century and its decline in later centuries were ecologically connected with such changes in climatic conditions.) It might be argued, however, that the same climatic change ought to have been beneficial for countries like Italy and Spain, and there is no clear evidence for this. Furthermore, some sources maintain

¹ A discussion of such losses in a different historical context appears in Hansen, "The Cost of Children's Mortality."

² Utterstrom, "Climatic Fluctuations."

³ Ibid., p. 10.

that climate in the prosperous 1150-1300 era was worse than the climate in the following centuries.¹ But perhaps the chief argument against the climate theory is that the period from 1300 on was characterized by falling wheat prices (see Table 4), suggesting good harvests rather than bad.²

Finally, there is still another view holding that a level of over-population had been attained by 1300, not permanently maintainable with the available resources and technology:

As long as the colonization movement went forward and new land was taken up, the crops from virgin lands encouraged men to establish new families and settlements. But, after a time the marginal character of marginal lands was bound to assert itself and the honeymoon of high yields was succeeded by long periods of reckoning, when the poorer lands, no longer new, punished the men who tilled them with failing crops and with murrain of sheep and cattle. In these conditions a fortuitous combination of adverse events, such as the succession of bad seasons in the second decade of the fourteenth century, was sufficient to reverse the entire trend of agricultural production and to send the population figures tumbling down.³

Thus, Postan and a number of other authors contend that population decline and/or economic "depression" began well before the Black Death.⁴ At least in the Malthusian form put forward by Postan and Slicher van Bath, however, the argument is vulnerable to the same criticism these very authors levy against the climatic theory. Over-population relative to the long-term capacity of the soil should have led to a period of failing harvests and low real wages

¹ Slicher van Bath, p. 161.

² Ibid.

³ Postan, "Rapport," p. 235.

⁴ Postan, "Some Economic Evidence," pp. 245-46; Lopez and Miskimin, p. 412; Slicher van Bath, p. 89. Florence suffered a profound economic crisis beginning about 1340; the King of England, because of reverses in the Hundred Years' War, defaulted upon enormous loans contracted from the great Florentine banks (see Meiss, pp. 61-62, Burckhardt, p. 50).

until the population fell to a maintainable level. But, from Tables 3 and 4, it is evident that the period 1350-1400, during which the bulk of the decline in population took place (see Fig. 1), was a period of relatively low wheat prices (good harvests) and high real wages.

Integrating some portions of the different theories outlined above, the following is put forward as a hypothesis consistent with the main body of evidence as to economic phenomena in the period under consideration. The initiating, autonomous cause of a break in economic trends was the onset of plague -- a source of ecological pressure upon the human population beginning with the Black Death of 1348-50 (or, beginning some 30 years earlier, according to some authors). The sudden population decline due to the arrival of the plague, with material property left essentially unaffected, raised overall per capita wealth in the short-term while drastically shifting relative returns and incomes in favor of the laboring and against the property-owning classes. In terms of price statistics, the short-term effects included a rise in wages and fall in wheat prices.¹ Under normal circumstances, Malthusian forces would then be expected to operate to increase population once again -- if so, the longer term aftermath would have been associated with rising population, falling real wages, and a recovery in wheat prices. But in this special situation the corrective forces were inhibited by the continuing plague now endemic, and recurrently breaking out in great attacks. Not only did the plague directly wipe out substantial fractions of what would have been a recovering population, but it reduced incentives to bear children and raise families. Consequently, population continued to fall throughout the 14th century, leading to further declines in wheat prices and

¹Wheat production is the resultant of property inputs (land, primarily) and labor inputs. With labor suddenly more scarce, but land as available as before, wheat production would tend to decline but in lesser proportion than the decline in labor input. Hence, there would be relatively good harvests in a per capita sense, and low wheat prices.

increases in wages. Secondary effects included shifts to less labor-intensive crops; tillage often gave way to pasture.¹ Furthermore, it is plausible to argue that whereas agriculture benefited by being able to abandon marginal lands, industry (being subject to increasing returns with respect to population size) suffered a loss of relative position.² Eventually, with the attenuation of the pressure of plague, the Malthusian forces began to assert their dominance; thus, in the latter part of the 15th century real wages decline once again.

The explanation offered above ascribes primary responsibility for the lag in aggregate recovery to plague recurrences. The alternative explanation of war need not be entirely rejected, especially in relation to stricken France. A high rate of real daily or hourly wages could have been in effect whenever conditions were peaceful enough to permit work -- but, with armies and marauders often about, the opportunity to engage in productive work may have been severely limited, quite apart from actual destruction. Thus, war tends to engender high wage rates but lower labor income (and per capita production). The third explanation mentioned, over-population entailing a natural self-corrective reaction, does not appear to be defensible.³

The explanations considered above were all in the nature of alternatives to a hypothesis that specifically relates the long-term depression to the shock engendered by the Black Death as a unique event -- comparable in some ways to the possible shock of a nuclear war.⁴ Langer's analysis outlines the supposed mechanism in economic

¹ Slicher van Bath, p. 142.

² As indicated above, however, the data are inconclusive as to the relative contraction of the rural and urban populations.

³ Still other, less cogent, explanations of the recession or lagging recovery have been offered, including an autonomous slowdown in technological advance, and reduced supplies of gold and silver.

⁴ Stonier's discussion (pp. 160, 165) suggests this hypothesis, though it is not explicitly stated therein.

terms: The great contraction of population, by reducing aggregate demand, led to a semi-permanent state of depression -- only relieved when population growth began once more.

For a short time the towns and cities experienced a flush of apparent prosperity. Many survivors of the epidemic had suddenly inherited substantial amounts of property and money....The rural areas, on the other hand, virtually collapsed. With fewer people to feed in the towns and cities, the farmers lost a large part of the market for their crops. Grain prices fell precipitately...the rural population fled to the cities en masse....And of course in the long run the depression of agriculture engulfed the cities in depression as well.¹

Langer clearly has in mind depression in the sense of impoverishment -- decline in per capita income -- and he is evidently referring to impoverishment of the mass of the population. But although the course of overall per capita income may be in doubt, it is substantially certain, as we have seen, that per capita income for the mass of the population rose considerably (except possibly in war-torn France).² It is true that "farmers" (lords?) lost a large part of their markets, but surviving farm tenants were able to extend and up-grade their holdings, and farm laborers were able to command higher wages. Labor in both city and countryside was scarce relative to the demand; far from there being flight en masse to the cities, it remains in doubt whether there was any substantial net shift of population at all. Leaving aside what seems (to the present author) to be very dubious reasoning about the economic mechanism of the supposed downward spiral, Langer's picture of events is not consistent with the evidence reviewed earlier.

The same author has also emphasized the psychological consequences of the Black Death: the interest in death and the macabre, the

¹Langer, "The Black Death," pp. 118, 121.

²Perroy, writing specifically of France, presents data casting considerable doubt upon earlier conclusions that real wages tended to rise in that country after 1350. He also remarks, however, that in this period we must not conclude that the wage-earners led a miserable life. (p. 235).

intensification of religious feeling, and the tendency toward licentious yet guilt-ridden behavior.¹ The view that there were such effects appears to have considerable justification.² An argument might conceivably be offered that this psychological transformation was associated with the economic depression, perhaps by leading to a withdrawal from worldly economic activities to otherworldly religious ones. But the evidence of the chronology in Table 1 suggests that, when we leave the economic sphere and turn to government and politics, the period was characterized by normal and even hyper-normal levels of energetic worldly activity. Nor was all this activity of a destructive nature. In England, for example, the same period saw significant developments in the direction of national unification and parliamentary independence.³

Turning to long-term socio-political effects, one question is the bearing of the Black Death upon the decline of the feudal system in Western Europe. Since the manorial system was decaying in any case, the plague catastrophe was more of an auxiliary force than an underlying cause of the great social change. The feudal system was, of course, status-oriented and tradition-bound. Although there seems to be great disagreement about the progress of commutation of personal services by the time of the Black Death,⁴ there nevertheless was enormous rigidity in the established terms of economic relationships. The system was ill-adapted to cope with the pressures for changes in these terms dictated by the new scarcity of labor relative to land. Hence the complaints about flight of labor, vagrancy, and the like, and legislative attempts (for example, in the Statutes of Laborers)

¹ Ibid., p. 121. See also Meiss, passim.

² Not entirely dissimilar phenomena occurred in the pre-Black Death period, however. The flagellant cult began earlier, for example as did expulsions and massacres of Jews. The Children's Crusade of 1212, and the "dancing manias" beginning in the 13th century might also be cited.

³ Cambridge History, pp. 895-96.

⁴ For a view of this question as it concerns England, see Miss Power's study. Evidently, in England commutation had progressed considerably though unevenly before 1350.

to reverse by fiat the concessions granted perforce by individual lords. On this hypothesis, outbursts like the Peasants' Revolt in England (1381) were caused basically by attempts to insist upon and enforce feudal dues and rights or status relationships no longer economically maintainable in the changed circumstances.¹ (The immediate cause of the Peasants' Revolt was the imposition of a severe poll tax, highly oppressive to the lower classes.) The pressure of labor scarcity contributed to the decay of the vestiges of serfdom, and a shift toward a contractual form of employment relationship.²

¹It is suggestive that the burden of villein services was heavy in a number of the countries where the Revolt was most violent. Power, p. 115.

²Seebohm, p. 277; Creighton, p. 192, Robbins, pp. 468-69.

V. CONCLUSIONS

1. The Black Death of 1348-50 swept away perhaps one-fourth of the population of Western Europe, though the "excess mortality" was somewhat lower. Among all recorded catastrophes, it is the one most comparable in suddenness, geographical scope, and scale of casualties to a hypothetical thermonuclear war. On the other hand, in contrast with war, there was no direct destruction of material property.

2. Although there are literary reports of organizational breakdowns in cities during the period when the plague was at its height, it is evident -- from records of governmental proceedings, and the fact of large-scale military and naval activity -- that the mechanisms of government did not collapse. It should, of course, be appreciated that "government" in the 14th century was a simpler and more limited activity than government today. (And, indeed, it might be conjectured that the socio-political structure of the 14th century had evolved so as to be particularly resilient to disaster.)¹

3. The short-term economic aftermath of the Black Death was very much in line with what economic theory would predict: a rapid rise in wages and per capita incomes of the laboring classes, and downward pressure on rents and the incomes of the propertied classes. The attempt to stem these pressures by government fiat (Statutes of Laborers) had only limited success. Economic recovery from this initial blow was rapid.

4. The century following the Black Death is usually considered by historians to be a period of depression, and some authors have attributed the depression to the Black Death. Review of the evidence indicates that it remains questionable whether the period saw an actual decline in per capita well-being in comparison with the level prevailing before the Black Death. And the century was a prosperous one for the laboring classes, the mass of the population. But

¹This point was suggested to the author by Michael Arnsten.

economic improvement was less than might have been expected, especially as population was relatively stable. The stagnation of this century appears to have been mainly due to the continuing recurrences of plague, secondarily to the effects of war (the latter applying especially for France).

5. The Black Death accelerated the decline of feudalism and the shift to modern contractual economic relationships. Although this development was proceeding in any case, the suddenly changed relative scarcities of labor and land dictated a "new deal" that the tradition-bound feudal system was unable to provide.

6. Direct inferences can hardly be drawn from this 14th-century catastrophe as to possible consequences of thermonuclear war. But we can state the negative conclusion that this historical record provides no support for contentions that social collapse or an economic downward spiral are necessary or likely consequences of massive disasters.

BIBLIOGRAPHY

1. Bean, J. M. W., "Plague, Population, and Economic Decline in England in the Later Middle Ages," The Economic History Review, 2nd Ser., v. 15 (April 1963).
2. Beveridge, W. H., "The Yield and Price of Corn in the Middle Ages," The Economic Journal (Economic History Series No. 2), May 1927, pp. 155-67.
3. Boccaccio, Decameron.
4. Burckhardt, Jacob, The Civilization of the Renaissance in Italy (Phaidon Press, Oxford, 1945).
5. Cipolla, Carlo M., "Economic Depression of the Renaissance?" The Economic History Review, 2nd Ser., v. 16 (April 1964).
6. Clark, Paul G., Vulnerability and Recuperation of a Regional Economy: A Study of the Impact of a Hypothetical Nuclear Attack on New England, The RAND Corporation, RM-1809 (October 1956).
7. Clark, Paul G. and D. V. T. Bear, "The Importance of Individual Industries for Defense Planning," The RAND Corporation, P-2093 (September 1960).
8. Creighton, Charles, A History of Epidemics in Britain, v. 1 (Cambridge, 1891).
9. Froissart, Sir John, Chronicles of England, France, and Spain, tr. Thomas Johnes.
10. Hansen, W. Lee, "A Note on the Cost of Children's Mortality," Journal of Political Economy, v. 65 (June 1957).
11. Herlihy, D., "Population, Plague and Social Change in Rural Pistoia, 1201-1430," The Economic History Review, 2nd Ser., v. 18 (1965).
12. Hirshleifer, Jack, "Some Thoughts on the Social Structure After a Bombing Disaster," The RAND Corporation, P-674 (August 1955).
13. -----, Disaster and Recovery: A Historical Survey, The RAND Corporation, RM-3079-PR (April 1963).
14. Langer, William L., "The Next Assignment," The American Historical Review, v. 63 (January 1958).
15. -----, "The Black Death," Scientific American (February 1964).

15. Levett, A. Elizabeth and A. Ballard, The Black Death, Oxford Studies in Social and Legal History, v. 5, Paul Vinogradoff, ed. (Oxford, 1916).
17. Lopez, R. S. and H. A. Miskimin, "The Economic Depression of the Renaissance," The Economic History Review, 2nd Ser., v. 14 (1961-62).
18. Meiss, Millard, Painting in Florence and Siena after the Black Death (Harper Torchbooks: Harper & Row, New York, 1964).
19. Mullett, Charles F., The Bubonic Plague and England (University of Kentucky Press, 1956).
20. Perroy, E., "Wage Labour in France in the Later Middle Ages," The Economic History Review, 2nd Ser., v. 8 (1955).
21. Postan, M., "Revisions in Economic History: IX -- The Fifteenth Century," Economic History Review, 2nd Ser., v. 2 (1949-50), pp. 160-67.
22. -----, "Some Economic Evidence of Declining Population in the Later Middle Ages," The Economic History Review, 2nd Ser., v. 2 (1950).
23. -----, "Moyen Age: Rapport," in Rapports du IXe Congres International des Sciences Historiques, I, pp. 225-41.
24. Power, E. E., "Historical Revisions: VII -- The Effects of the Black Death on Rural Organization in England," History, New Series, v. 3 (1918), pp. 110-16.
25. Previte-Orton, C. W., The Shorter Cambridge Medieval History (Cambridge University Press; Cambridge, 1953), v. 2.
26. Robbins, Helen, "A Comparison of the Effects of the Black Death on the Economic Organization of France and England," Journal of Political Economy, v. 36 (August 1928).
27. Russell, Josiah Cox, British Medieval Population (University of New Mexico Press, Albuquerque, 1948).
28. Saltmarsh, John, "Plague and Economic Decline in England in the Later Middle Ages," Cambridge Historical Journal, v. 7 (1941).
29. Seebohm, F., "The Black Death, and Its Place in English History," Fortnightly Review, v. 2 (1865) [in two parts].
30. Slicher van Bath, B. H., The Agrarian History of Western Europe, A. D. 500-1850 (Edward Arnold; London, 1963), Olive Ordish, tr.

31. Stonier, Tom, Nuclear Disaster (Meridian Books: World Publishing Co.; Cleveland, 1963).
32. Utterstrom, Gustaf, "Climatic Fluctuations and Population Problems in Early Modern History," The Scandinavian Economic History Review, v. 3 (1955).